AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

1. **(Currently Amended)** An organic light emitting device comprising

(i) a first electrode;

(ii) a region comprising a mixture of (1) N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine, and (2) an electron transport material, and which region further optionally comprises an organic luminescent material, and wherein said mixed region is capable of emitting light in response to hole-electron recombination;

(iii) a second electrode;

(iv) ~~an optional~~ a thermal layer coated on at least one of the first and second electrodes, wherein one of said first and second electrodes is a hole injection anode, and one of said electrodes is an electron injection cathode, and wherein the organic light emitting device further comprises at least one of

(v) a hole transport region interposed or situated between the first electrode and the mixed region; and

(vi) an electron transport region interposed or situated between the mixed region and the cathode.

2. **(Original)** A device in accordance with **claim 1** wherein there is at least one of (A) the hole transport material comprising the hole transport region (v) is selected from the group consisting of aromatic amines, porphyrins and indolocarbazoles, and wherein (B) the electron transport material comprising the mixed region (ii) or the electron transport of region (vi) is selected from the group consisting of metal oxinoids, stilbenes, triazines, porphyrins, and quinolines.

3. **(Original)** A device in accordance with **claim 1** wherein in the mixed region (ii) the electron transport material is a metal oxinoid.

4. **(Original)** A device in accordance with **claim 1** wherein the mixed region comprises from about 20 weight percent to about 80 weight percent of said N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine; and said electron transport component or material is present in an amount of from about 80 weight percent to about 20 weight percent and said electron transport is a metal oxinoid, and wherein the weight percents are based on the total weight of materials comprising the mixed region (ii).

5. **(Original)** A device in accordance with **claim 1** wherein the mixed region comprises from about 35 weight percent to about 65 weight percent of said N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD); and from about 65 weight percent to about 35 weight percent of said electron transport of a metal oxinoid, and wherein the weight percent total thereof is about 100 weight percent.

6. **(Original)** A device in accordance with **claim 3** wherein the metal oxinoid is selected from the group consisting of tris(8-hydroxyquinoline) aluminum (Alq_3) and bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq).

7. **(Original)** A device in accordance with **claim 1** wherein the electron transport region (vi) contains Alq_3 or Balq, and said mixed region (ii) contains from about 0.01 weight percent to about 10 weight percent of a fluorescent luminescent material.

All

8. **(Original)** A device in accordance with **claim 7** wherein the fluorescent material is selected from the group consisting of coumarin, dicyanomethylene pyranes, polymethine, oxabenzanthrane, xanthene, pyrylium, carbostyl, perylene, acridone, quinacridone, rubrene, anthracene, coronene, phenanthrecene, pyrene, butadiene, stilbene, lanthanide metal chelate complexes, rare-earth metal chelate complexes, and 4-(dicyanomethylene)-2-l-propyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran.

9. **(Original)** A device in accordance with **claim 7** wherein the fluorescent material is selected from the group consisting of rubrene, N,N'-dimethylquinacridone (DMQ), 10-2-(benzothiazolyl)-2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H, 5H, 11H-(1)benzopyropyrano (6,7,-8-ij) quinolizin-11-one (C545T), and (2-(1,1-dimethylethyl)-6-(2-(2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H,5H-benzo(ij)quinolizin-9-yl)ethenyl)-4H-pyran-4-ylidene) propanedinitrile (DCJTB).

10. **(Original)** A device in accordance with **claim 1** wherein the mixed region comprises from about 3 weight percent to about 30 weight percent of a luminescent material, and wherein the luminescent material is a phosphorescent material.

11. **(Original)** A device in accordance with **claim 10** wherein the phosphorescent material is selected from the group consisting of 2,3,7,8,12,13,17,18-octaethyl-21H,23H-phorpine platinum(II) (PtOEP) and fac tris(2-phenylpyridine)iridium ($Ir(ppy)_3$).

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12. **(Original)** A device in accordance with **claim 1** wherein there is at least one of (A) said hole transport region (v) comprising N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD); and (B) said electron transport region (vi) contains an electron transport material, and wherein the electron transport material in the mixed region (ii) and (vi) are similar components.

13. **(Original)** A device in accordance with **claim 1** wherein there is at least one of (A) said hole transport material comprising said hole transport region (v) is dissimilar than said (p-biphenyl)-N,N'-diphenyl benzidine; and (B) wherein said electron transport region (vi) contains an electron transport material, and wherein said electron transport material in the mixed region (ii) and region (vi) are dissimilar.

14. **(Original)** A device in accordance with **claim 1** wherein each of said regions (ii), (v) and (vi) contain from 1 to about 10 layers.

15. **(Original)** A device in accordance with **claim 14** wherein (1) a first layer of said electron transport region is contacting the mixed region, and which first layer comprises a material selected from the group consisting of metal oxinoids and quinolines; and wherein (2) a second layer of the electron transport region is contacting the cathode, and which second layer comprises a material selected from the group consisting of metal oxinoid, phthalocyanine and triazine.

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16. **(Original)** A device in accordance with **claim 15** wherein said metal oxinoid is tris(8-hydroxyquinoline)aluminum (Alq_3), bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq), or a quinoline of 1,4-bis(4-phenylquinolin-2-yl)benzene, 4,4'-bis(4-phenylquinolin-2-yl)-1,1'-biphenyl (TA); and said second layer is a metal oxinoid of tris(8-hydroxyquinoline)aluminum (Alq_3), bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq), copper phthalocyanine (CuPc), or a triazine comprising 4,4'-bis-[2-(4,6-diphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-p-tolyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-m-tolyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-p-methoxyphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, or 4,4'-bis-[2-(4,6-di-m-methoxyphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, 2,4,6-tris(4-biphenylyl)-1,3,5-triazine.

17. **(Original)** A device in accordance with **claim 1** wherein said hole transport region (v) is comprised of at least two layers.

18. **(Original)** A device in accordance with **claim 17** wherein one layer of said hole transport region contacts the anode, and which layer comprises a porphyrin; and (2) a second layer of the hole transport region contacts the mixed region, and which second layer comprises a material selected from the group consisting of tertiary aromatic amines, and indolocarbazoles.

19. **(Original)** A device in accordance with **claim 18** wherein the first layer comprises copper phthalocyanine, and the second layer comprises N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), 5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole, or 2,8-dimethyl-5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole.

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20. **(Original)** A device in accordance with **claim 1** wherein said hole transport region comprises a layer comprised of a mixture of from about 25 weight percent to about 99 weight percent of a porphyrin, and from about 75 weight percent to about 1 weight percent of an aromatic tertiary amine or an indolocarbazole.

21. **(Original)** A device in accordance with **claim 20** wherein said hole transport region includes a layer comprised of a mixture of (i) a porphyrin of copper phthalocyanine (CuPc), and (ii) a tertiary aromatic amine of N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), or an indolocarbazole of 5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole, or 2,8-dimethyl-5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole.

22. **(Original)** A device in accordance with **claim 1** wherein there is at least one of (A) said anode, which anode is optionally indium-tin-oxide, and (B) said cathode is selected from the group consisting of (i) a layer comprised of Mg and Ag; (ii) a layer comprised of Al; (iii) a layer comprised of indium-tin-oxide; or (iv) a layer comprised of (1) an organic compound, (2) Mg, and (3) Ag.

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23. **(Original)** A device in accordance with **claim 22** wherein the cathode further comprises an alkaline metal or a compound thereof.

24. **(Original)** A device in accordance with **claim 23** wherein the alkaline metal is selected from the group consisting of Li, Na, K and Cs.

25. **(Original)** A device in accordance with **claim 1** wherein said thermal protective element is present and is comprised of a layer of SiO, SiO_2 or mixtures thereof.

26. **(Original)** A device in accordance with **claim 1** wherein the mixed region (ii) has a thickness of from about 5 nanometers to about 500 nanometers; the hole transport region (v) has a thickness of from about 5 nanometers to about 250 nanometers; and the electron transport region (vi) has a thickness of from about 5 nanometers to about 100 nanometers.

27. **(Currently Amended)** A device in accordance with **claim 1** and comprising

~~(i)~~ an anode of indium-tin-oxide with a thickness of from about 30 to about 300 nanometers coated on a substrate, the anode and the substrate being capable of transmitting at least about 70 percent of radiation of a wavelength of from about 400 nanometers to about 750 nanometers;

~~(ii)~~ a hole transport region situated on the anode comprised of a material selected from the group consisting of copper phthalocyanine (CuPc), N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), 5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole, and 2,8-dimethyl-5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole; and which region has a thickness of from about 5 nanometers to about 100 nanometers;

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~~(iii)~~ a mixed region situated on the hole transport region comprised of from about 35 weight percent to about 65 weight percent of N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), and from about 65 weight percent to about 35 weight percent of tris(8-hydroxyquinoline) aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato) aluminum, wherein all weight percents are based on the total weight of materials comprising the mixed region, and wherein the thickness of the mixed region is from about 20 nanometers to about 200 nanometers;

~~(iv)~~ an electron transport region situated on the mixed region comprised of tris(8-hydroxyquinoline) aluminum (Alq_3) or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq) wherein the thickness of the electron transport region is from about 5 nanometers to about 50 nanometers;

~~(v)~~ a cathode situated on the electron transport region comprised of one of a layer comprising (1) an Mg:Ag alloy or Al of a thickness of from about 50 nanometers to about 500 nanometers; ~~and~~ or (2) from about

40 volume percent to about 55 percent of Mg; from about 2 volume percent to about 10 volume percent of Ag; and from about 55 volume percent to about 40 volume percent of Alq_3, wherein the thickness of the first layer is from about 100 nanometers to about 600 nanometers coated with said layers with a thickness of from about 50 nanometers to about 500 nanometers comprising a metal or a metal alloy; and

~~(vi)~~ a thermal protective layer situated on the cathode comprised of SiO, SiO_2 or mixtures thereof of a thickness of from about 100 nanometers to about 1,000 nanometers.

All

28. **(Currently Amended)** A device in accordance with **claim 27** wherein the mixed region further comprises one of

~~(i)~~ about 0.2 weight percent to about 2 weight percent of a luminescent material selected from the group consisting of rubrene, N,N'-dimethylquinacridone (DMQ), and 10-2-(benzothiazolyl)-2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H, 5H, 11H-(1)benzopyropyrano (6,7,-8-ij) quinolizin-11-one (C545T);

~~(ii)~~ about 0.2 weight percent to about 5 weight percent of (2-(1,1-dimethylethyl)-6-(2-(2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H,5H-benzo(ij)quinolizin-9-yl)ethenyl)-4H-pyran-4-ylidene) propanedinitrile (DCJTB); ~~and~~ or

~~(iii)~~ about 5 weight percent to about 25 weight percent of 2,3,7,8,12,13,17,18-octaethyl-21H,23H-phorpine platinum(II) (PtOEP).

29. **(Currently Amended)** A device in accordance with **claim** 1 and comprising

~~(i)~~ an anode of indium-tin-oxide with a thickness of from about 30 to about 300 nanometers coated on a substrate;

~~(ii)~~ a hole transport region in contact with said anode comprised of a compound selected from the group consisting of N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), 5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole, and 2,8-dimethyl-5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole; and which region further comprises a buffer layer contacting the anode, and which buffer layer is comprised of copper phthalocyanine, wherein the thickness of the buffer layer is from about 10 nanometers to about 30 nanometers, and the thickness of the hole transport region is from about 5 nanometers to about 20 nanometers greater than the thickness of the buffer layer;

~~(iii)~~ a mixed region situated on the hole transport region comprised of from about 35 weight percent to about 65 weight percent of N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD) and from about 65 weight percent to about 35 weight percent of tris(8-hydroxyquinoline)aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato) aluminum, wherein all weight percents are based on the total weight of materials comprising the mixed region, and wherein the thickness of the mixed region is from about 20 nanometers to about 200 nanometers;

~~(iv)~~ an electron transport region situated on the mixed region comprised of tris(8-hydroxyquinoline)aluminum (Alq_3) or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq), wherein the thickness of the electron transport region is from about 5 nanometers to about 50 nanometers;

~~(v)~~ a cathode situated on the electron transport region comprised of one of (1) a first layer comprised of Mg:Ag alloy or Al of a

thickness of from about 50 nanometers to about 500 nanometers; ~~and~~ or (2) a second layer comprised of from about 40 volume percent to about 55 volume percent of Mg; from about 2 volume percent to about 10 volume percent of Ag; and from about 55 volume percent to about 40 volume percent of Alq_3, wherein the thickness of the first layer is from about 100 nanometers to about 600 nanometers; and the second layer of thickness is from about 50 nanometers to about 500 nanometers and comprises a metal or a metal alloy; and

~~(vi)~~ a thermal protective layer situated on the cathode comprised of SiO, SiO_2 or mixtures thereof of a thickness of from about 100 nanometers to about 1,000 nanometers.

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30. **(Currently Amended)** A device in accordance with **claim 29** wherein the mixed region further comprises one of

~~(i)~~ from about 0.2 weight percent to about 2 weight percent of a luminescent material selected from the group consisting of rubrene, N,N'-dimethylquinacridone (DMQ), and 10-2-(benzothiazolyl)-2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H, 5H, 11H-(1)benzopyropyrano (6,7,-8-ij) quinolizin-11-one (C545T);

~~(ii)~~ from about 0.2 weight percent to about 5 weight percent of (2-(1,1-dimethylethyl)-6-(2-(2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H,5H-benzo(ij)quinolizin-9-yl)ethenyl)-4H-pyran-4-ylidene) propanedinitrile (DCJTB), and

~~(iii)~~ from about 5 weight percent to about 25 weight percent of 2,3,7,8,12,13,17,18-octaethyl-21H,23H-phorpine platinum(II) (PtOEP).

31. **(Currently Amended)** A device in accordance with **claim 1** and comprising

~~(i)~~ ——an anode of indium-tin-oxide with a thickness of from about 50 to about 300 nanometers coated on a substrate, the anode and the substrate being capable of transmitting at least about 70 percent of radiation of wavelength of from about 400 nanometers to about 750 nanometers;

~~(ii)~~ ——a hole transport region situated on the anode comprised of at least one material selected from the group consisting of copper phthalocyanine (CuPc), N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), 5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole, and 2,8-dimethyl-5,11-di-naphthyl-5,11-dihydroindolo[3,2-b]carbazole; and which region has a thickness of from about 5 nanometers to about 100 nanometers;

~~(iii)~~ ——a mixed region situated on the hole transport region comprised of from about 35 weight percent to about 65 weight percent of N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD) and from about 65 weight percent to about 35 weight percent of tris(8-hydroxyquinoline)aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato) aluminum; and wherein the thickness of the mixed region is from about 20 nanometers to about 200 nanometers;

~~(iv)~~ ——an electron transport region situated on the mixed region comprising (1) a first layer of thickness from about 5 nanometers to about 25 nanometers contacting the mixed region, wherein this first layer is comprised of a material selected from the group consisting of tris(8-hydroxyquinoline)aluminum (Alq_3), bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq), and 1,4-bis(4-phenylquinolin-2-yl)benzene, 4,4'-bis(4-phenylquinolin-2-yl)-1,1'-biphenyl (TA); and (2) a second layer of a thickness of from about 5 nanometers to about 25 nanometers contacting the cathode, wherein the second layer is comprised of a material selected from

the group consisting of tris(8-hydroxyquinoline) aluminum (Alq_3), bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum (Balq), copper phthalocyanine (CuPc), 4,4'-bis-[2-(4,6-diphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-p-tolyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-m-tolyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-p-methoxyphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, 4,4'-bis-[2-(4,6-di-m-methoxyphenyl-1,3,5-triazinyl)]-1,1'-biphenyl, and 2,4,6-tris(4-biphenylyl)-1,3,5-triazine;

~~(v)~~ a cathode situated on the electron transport region comprised of one of (1) a layer comprised of Mg:Ag alloy or Al of a thickness of from about 50 nanometers to about 500 nanometers; ~~and~~ or (2) a first layer comprised of from about 40 volume percent to about 55 volume percent of Mg; from about 2 volume percent to about 10 volume percent of Ag; and from about 55 volume percent to about 40 volume percent of Alq_3, wherein the thickness of the first layer is from about 100 nanometers to about 600 nanometers, and coated with a second layer of a thickness of from about 50 nanometers to about 500 nanometers comprising a metal or a metal alloy; and

~~(vi)~~ a thermal protective layer situated on the cathode comprised of SiO, SiO_2 or mixtures thereof of a thickness of from about 100 nanometers to about 1,000 nanometers.

32. **(Currently Amended)** A device in accordance with **claim 1** wherein the mixed region further comprises one of

~~(i)~~ from about 0.2 weight percent to about 2 weight percent of a luminescent material selected from the group consisting of rubrene, N,N'-dimethylquinacridone (DMQ), and 10-2-(benzothiazolyl)-2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H, 5H, 11H-(1)benzopyropyrano (6,7,-8-ij) quinolizin-11-one (C545T);

~~(ii)~~ from about 0.2 weight percent to about 5 weight percent of (2-(1,1-dimethylethyl)-6-(2-(2,3,6,7-tetrahydro-1,1,7,7-tetramethyl-1H,5H-benzo(ij)quinolizin-9-yl)ethenyl)-4H-pyran-4-ylidene)propanedinitrile (DCJTB); ~~and~~ or

~~(iii)~~ from about 5 weight percent to about 25 weight percent of 2,3,7,8,12,13,17,18-octaethyl-21H,23H-phorpine platinum(II) (PtOEP).

33. **(Original)** A display comprising at least one organic light emitting device of **claim 1.**

34. **(Currently Amended)** A device in accordance with **claim 1** and comprising in sequence

~~(i)~~ ——said first electrode;

~~(ii)~~ ——said mixed region with from about 1 to about 3 layers comprising a mixture of (1) N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine (biphenyl TPD), and (2) an electron transport component, and which mixed region further comprises an organic luminescent material;

~~(iii)~~ ——said second electrode;

~~(iv)~~ ——a thermal protective layer coated on one of the first and second electrodes wherein one of said first and second electrodes is a hole injection anode, and one of said electrodes is an electron injection cathode, and wherein the organic light emitting device further comprises at least one of

~~(v)~~ ——a hole transport region positioned between the first electrode and the mixed region; and

~~(vi)~~ ——an electron transport region positioned between the mixed region and the cathode.

35. **(Original)** A device in accordance with **claim 34** wherein the mixed region emits light in response to hole electron recombination.

36. **(Original)** A device in accordance with **claim 1** further including a buffer layer in said hole transport region (v).

37. **(Currently Amended)** A device in accordance with **claim 1** wherein said thermal layer is a protective layer ~~is present~~, and which device further contains a buffer layer.

38. **(Original)** A device in accordance with **claim 1** wherein each of said regions contains from 1 to about 5 layers.

39. **(Original)** A device in accordance with **claim 1** wherein each of said regions contains from about 2 to about 4 layers.

40. **(Original)** A device in accordance with **claim 1** wherein said electron transport of (ii) also functions as a luminescent material or a light emitter.

41. **(Original)** A device in accordance with **claim 1** wherein a luminescent component is further contained in the mixed region, and wherein said electron transport is free of functioning as an emitter.

42. **(Currently Amended)** A device comprising

(i) a first electrode;

(ii) a region comprising a mixture of (1) N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine, and (2) an electron transport material, and which region further optionally comprises an organic luminescent material,

(iii) a second electrode;

(iv) ~~an optional~~ a thermal layer coated on at least one of the first and second electrodes, wherein one of said first and second electrodes is a hole injection anode, and one of said electrodes is an electron injection cathode, and wherein the organic light emitting device further comprises at least one of

(v) a hole transport region interposed or situated between the first electrode and the mixed region; and

(vi) an electron transport region interposed or situated between the mixed region and the cathode, and wherein said device contains in said region (ii) a luminescent component wherein said electron transport material also functions as a luminescent component, or wherein said region (ii) is free of a luminescence component where said electron transport component also functions as a luminescent component.

43. **(New)** An organic light emitting device comprising

(i) a first electrode;

(ii) a region comprising a mixture of (1) N,N'-bis(p-biphenyl)-N,N'-diphenyl benzidine, and (2) an electron transport material, and which region further optionally comprises an organic luminescent material, and wherein said mixed region is capable of emitting light in response to hole-electron recombination;

(iii) a second electrode;

(iv) a thermal layer coated on at least one of the first and second electrodes, wherein one of said first and second electrodes is a hole injection anode, and one of said electrodes is an electron injection cathode, and wherein a hole transport region is interposed or situated between the first electrode and the mixed region;

(v) a hole transport region interposed or situated between the first electrode and the mixed region; and

(vi) an electron transport region interposed or situated between the mixed region and the cathode.

44. **(New)** A device in accordance with **claim 43** and wherein said electron transport region is interposed or situated between the mixed region and the cathode.

45. **(New)** A device in accordance with **claim 1** wherein a hole transport region is situated between the first electrode in the mixed region and an electron transport region situated between the mixed region and the cathode.